CO2 Carrier PCB

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1 General

The CO2-Carrier PCB consists of a basic board and the “SpO2 module” (optional) and the “CO2 module” (optional). The “CO2 module” comprises the Power PCB and the Signal Processor PCB.

If a repair is necessary, replace the complete CO2 Carrier, or the complete Power PCB, or the complete Signal Processor PCB.

Electrostatic discharge may damage electrostatic sensitive devices. When handling electrostatic sensitive devices, use a static-dissipative mat and a static dissipative wrist strap.

X2			
Pin	Assignment	Pin	Assignment
1c	+12 V	8c	AGND
2c	+24 V	15c	DGND
3c	+15 V	16c	+5 V
4c	-15 V		

1.1 CO2 Carrier PCB

1.1.1 Pin assignment

X3			
Pin	Assignment	Pin	Assignment
1	+5 V-ISO-1	8	TXD-SpO2
2	GND-ISO-1	9	RXD-SpO2
3	GND-ISO-1	10	CTS-SpO2
4	+15 V-ISO	11	Reset SpO2
5	GND-ISO-1	12	GND-ISO-1
6	-15 V-ISO	13	ECG-SYNC (ISO)
7	-15 V-ISO	14	GND-ISO-1

X11			
Pin	Assignment	Pin	Assignment
1	-15 V	2	+15 V

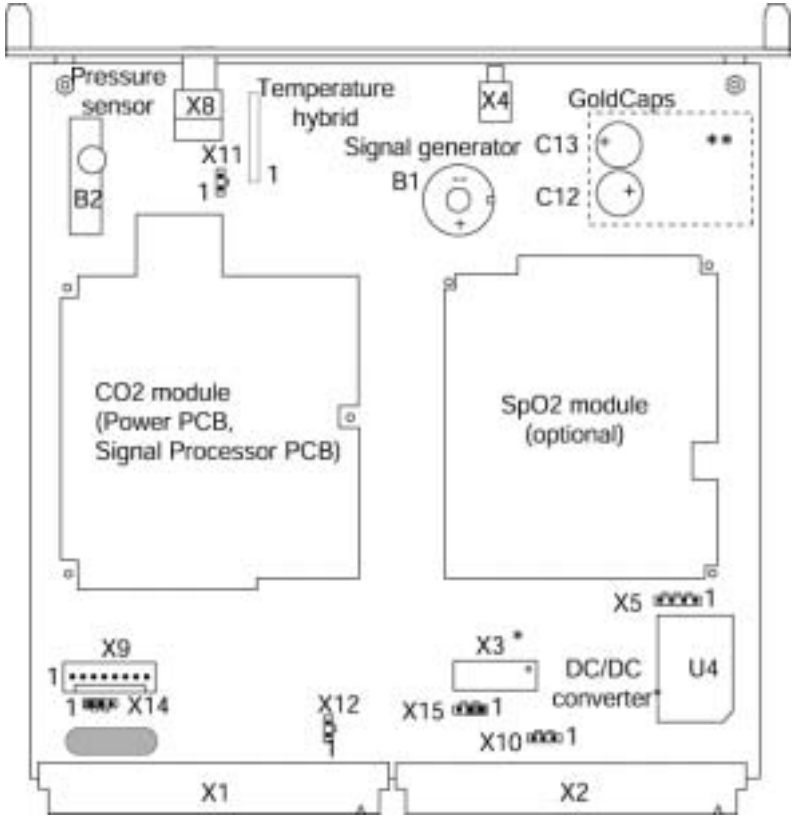

Fig. 1 CO2 Carrier PCB

* X3 and the DC/DC converter are integral parts of the optional “SpO2”.

** Supergold PCB according to TSB No. 29 (Evita 4/Evita 2 dura)

** Supergold PCB (EvitaXL)

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1.1.2 Replacing the CO2-Carrier PCB

1 Switch off the device.

2 Unplug the power plug of the device from the socket-outlet.

Electrostatic discharge may damage electrostatic sensitive devices. When handling electrostatic sensitive devices, use a static-dissipative mat and a static dissipative wrist strap.

3 Create ESD conditions.

4 Remove the screws from the CO2-Carrier PCB (Note: the screws are located on the back of the device).

5 Remove the faulty CO2-Carrier PCB from the device.

6 Remove the CO2 module (Power PCB, Signal Processor PCB), the SpO2 module (optional), the connector X3, and the DC/DC converter U4 (is part of the optional SpO2).

A faulty CO2-Carrier PCB is special waste. Dispose of a faulty CO2-Carrier PCB according to applicable waste disposal regulations.

7 Dispose of the faulty printed circuit board according to applicable waste disposal regulations.

8 Install the CO2 module, the SpO2 module (optional), the connector X3, and the DC/DC converter U4 on the new CO2 Carrier PCB.

9 Push the new CO2-Carrier PCB into the device.

10 Secure the CO2-Carrier PCB to the device using the screws.

11 Plug the power plug of the device into the socket-outlet.

12 Switch the device on.

13 Perform “electrical safety tests” and “function tests” as described in the PMS procedure. For the USA and Canada: test according to CAN/CSA-22.2 No. 601.1-M90.

1.1.3 Power PCB

Electrostatic discharge may damage electrostatic sensitive devices. When handling electrostatic sensitive devices, use a static-dissipative mat and a static dissipative wrist strap.

1.1.4 Power supply

J1			
Pin	Assignment	Pin	Assignment
1	+5 V	3	–

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J1			
2	GND		

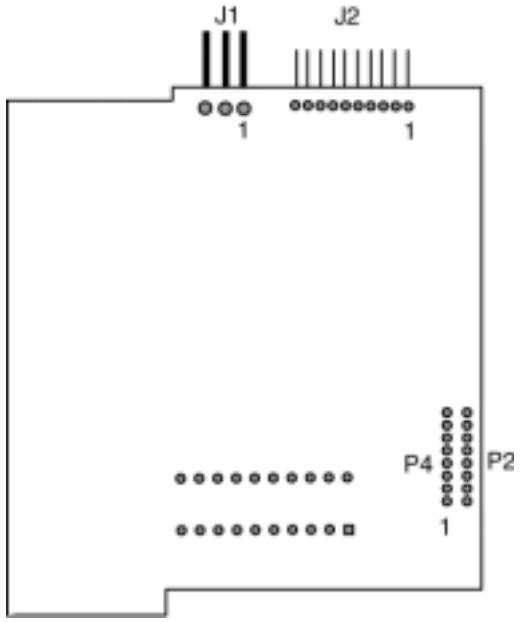

Fig. 2 Soldering side of the Power PCB

1.1.5 Replacing the Power PCB

1 Switch off the device.

2 Unplug the power plug of the device from the socket-outlet.

Electrostatic discharge may damage electrostatic sensitive devices. When handling electrostatic sensitive devices, use a static-dissipative mat and a static dissipative wrist strap.

3 Create ESD conditions.

4 Remove the CO2-Carrier PCB from the device.

5 Unscrew the faulty Power PCB (Fig. 1) from the CO2-Carrier PCB.

A faulty Power PCB is special waste. Dispose of the faulty Power PCB according to applicable waste disposal regulations.

6 Dispose of the faulty printed circuit board according to applicable waste disposal regulations.

7 Secure the new Power PCB to the CO2-Carrier PCB.

8 Push the CO2-Carrier PCB into the device.

9 Secure the CO2-Carrier PCB to the device using the screws.

10 Plug the power plug of the device into the socket-outlet.

11 Switch the device on.

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12 Perform “electrical safety tests” and “function tests” as described in the PMS procedure. For the USA and Canada: test according to CAN/CSA-22.2 No. 601.1-M90.

1.1.6 Signal Processor PCB

Electrostatic discharge may damage electrostatic sensitive devices. When handling electrostatic sensitive devices, use a static-dissipative mat and a static dissipative wrist strap.

1.1.7 Power supply

The Power PCB generate the necessary voltage. The “J4” connector of the Signal Processor PCB and the “P4” connector of the Power PCB are directly interconnected. The voltage must be measured at the “P4” connector of the Power PCB.

J4			
Pin	Assignment	Pin	Assignment
1	+5 V	5	-15 V
2	+8.5 V	6	+15 V
3	DGND	7	on/off for +8.5 V
4	AGND	8	on/off for +15 V

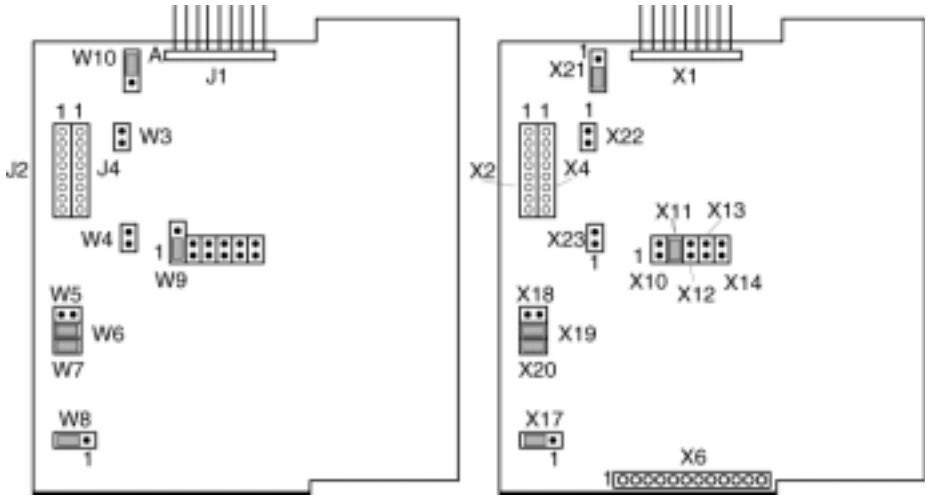

Fig. 3 Signal Processor PCB

1.1.8 Replacing the Signal Processor PCB

1 Switch off the device.

2 Unplug the power plug of the device from the socket-outlet.

Electrostatic discharge may damage electrostatic sensitive devices. When handling electrostatic sensitive devices, use a static-dissipative mat and a static dissipative wrist strap.

3 Create ESD conditions.

4 Remove the fixing screws from the CO2-Carrier PCB.

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5 Remove the CO2-Carrier PCB from the device.

6 Unscrew the faulty Signal Processor PCB (Fig. 1) from the CO2-Carrier PCB.

A faulty Signal Processor PCB is special waste. Dispose of the faulty Signal Processor PCB according to applicable waste disposal regulations.

7 Dispose of the faulty Signal Processor PCB according to applicable waste disposal regulations.

8 Check the jumper position (see old Signal Processor PCB) and change it, if necessary.

9 Faulty Signal Processor PCB

10 Secure the new Signal Processor PCB to the CO2-Carrier PCB.

11 Push the CO2-Carrier PCB into the device.

12 Secure the CO2-Carrier PCB to the device using the screws.

13 Plug the power plug of the device into the socket-outlet.

14 Switch the device on.

15 Perform “electrical safety tests” and “function tests” as described in the PMS procedure. For the USA and Canada: test according to CAN/CSA-22.2 No. 601.1-M90.

1.1.9 Troubleshooting and repair

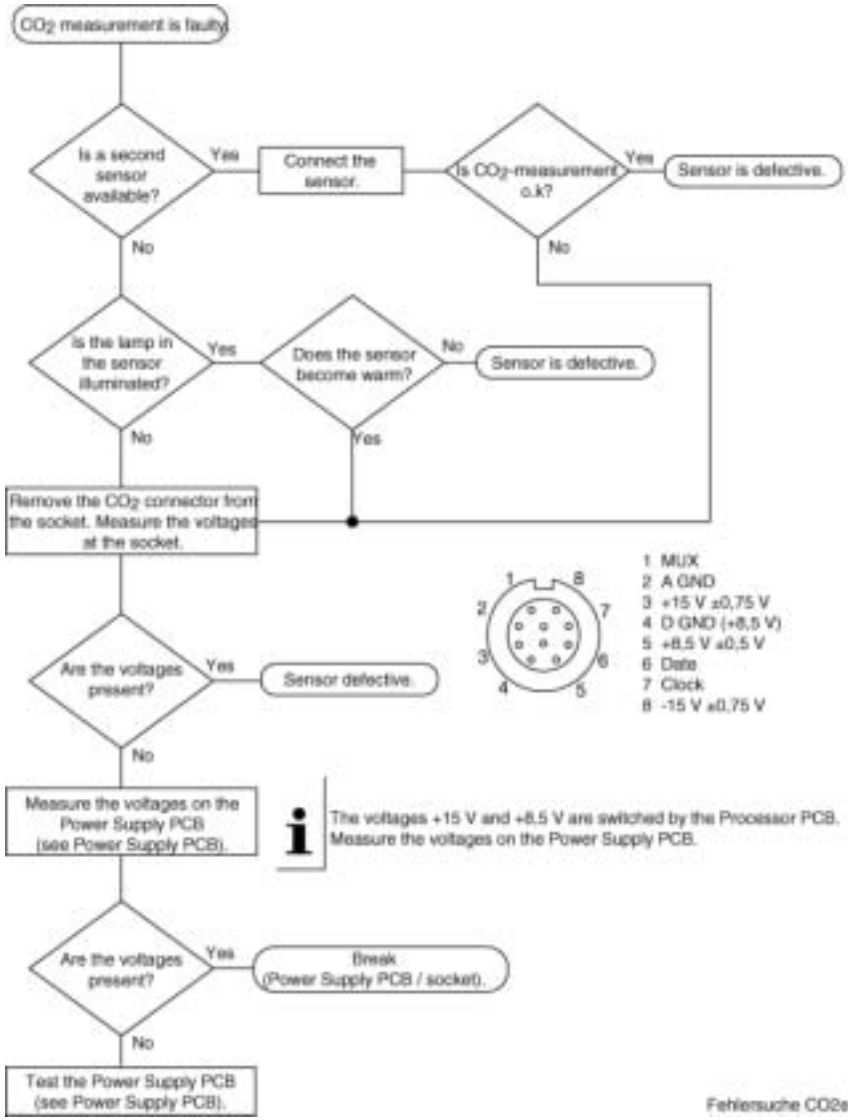
CO2 measurement is faulty
Is a second sensor available?
Yes
Connect the sensor.
Is CO2-measurement o.k?
Yes
Sensor is defective.
No
No
Is the lamp in the sensor illuminated?
Yes
Does the sensor become warm?
No
Sensor is defective.
No
Yes
Remove the CO2 connector from the socket. Measure the voltages at the socket.
1 MUX
2 A GND
3 +15 V ±0,75 V
4 D GND (+8,5 V)
5 +8,5 V ±0,5 V
6 Data
7 Clock
8 -15 V ±0,75 V
Are the voltages present?
Yes
Sensor defective.
No
Measure the voltages on the Power Supply PCB (see Power Supply PCB).
The voltages +15 V and +8,5 V are switched by the Processor PCB. Measure the voltages on the Power Supply PCB.
Are the voltages present?
Yes
Break (Power Supply PCB / socket).
No
Test the Power Supply PCB (see Power Supply PCB).
Fehlersuche CO2s

Fig. 4 Troubleshooting chart

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1.1.10 CO2 sensor

The CO2 sensor can only be repaired at the Lübeck workshop.

The lamp in the CO2 sensor has an estimated service life of approx. 40,000 hours (about 4 1/2 years of continuous operation). Service life is reduced if the CO2 sensor is dropped or exposed to strong vibrations.

A test filter is integrated in the CO2 sensor cable. This test filter is tuned to the specific CO2 sensor. If the test filter is replaced during repair, it must be tuned to the CO2 sensor.

1.1.11 Calibrating the CO2 sensor

1 Plug the power plug of the device into the socket-outlet.
2 Switch the device on.
3 Switch to “CO2” mode.
4 Calibrate the CO2 sensor using test gas.
5 Insert the test filter into the mount of the CO2 sensor.
6 Read the CO2 value on the display.
7 Attach a new clip to the test filter whose value is the nearest to the measured value. (Note: A clip set must be ordered separately!)

1.1.12 SpO2 module (optional)

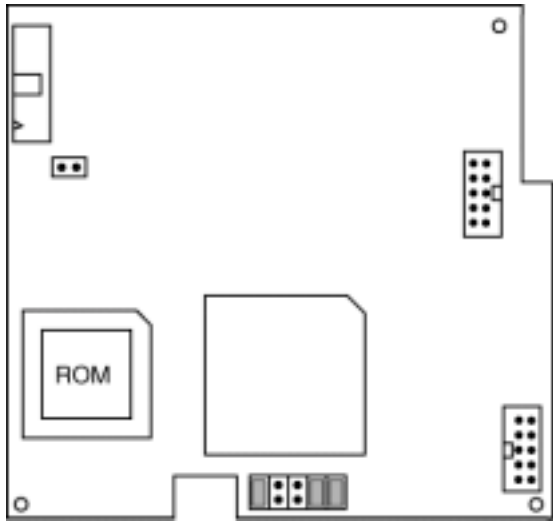

Fig. 5 SpO2 module

The “SpO2 module” (optional) comprises the following parts:

- SpO2 module with connecting cable for X3
- DC/DC converter (U4) on the CO2-Carrier PCB
- Connector “X3” on the CO2-Carrier PCB

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